A multi-layer model for incident reporting systems

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Context and objectives

- 1997: DGAC call for tender...
- ... to ëdesign a rigorous methodology to analyse operational incidents, with the purpose of using it for an incident reporting & analysis systemí
- Airbus & DÈdale selected
- One year study

Methodology

AIRS BASIS (HFR) + Review of existing systems (SIAM)

Concepts

innovative model

Field study (AIRS)

Lessons from the ëfieldí

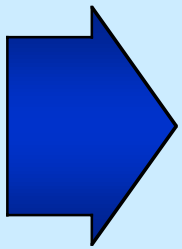
- All actors in the system agree there is a strong need for well-designed incident reporting
- Human factors capability must be an integral part of the incident reporting system
- Keywords must be unambiguous, and easily used by a wide variety of safety specialists.
- Inter-rater reliability is an important issue if cross-fleet and cross-industry trends are to be detected.

Lessons from the ëfieldí

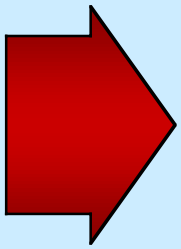
- The system should be extended beyond pilots to include all employee groups whose work impacts safety.
- Greater effort must now be given to the analysis of the reports. *Quantity of input should be balanced by quality of output.*
- A protocol is needed to ensure that ordered information is sent to relevant others in a timely fashion (analysts' reports become inputs for other analysts).

Prioritization criteria

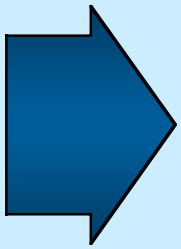
- incident recurrence probability
- potential accident severity
- potential accident proximity (remaining protections)
- importance of the potential ësafety lessoní



Risk

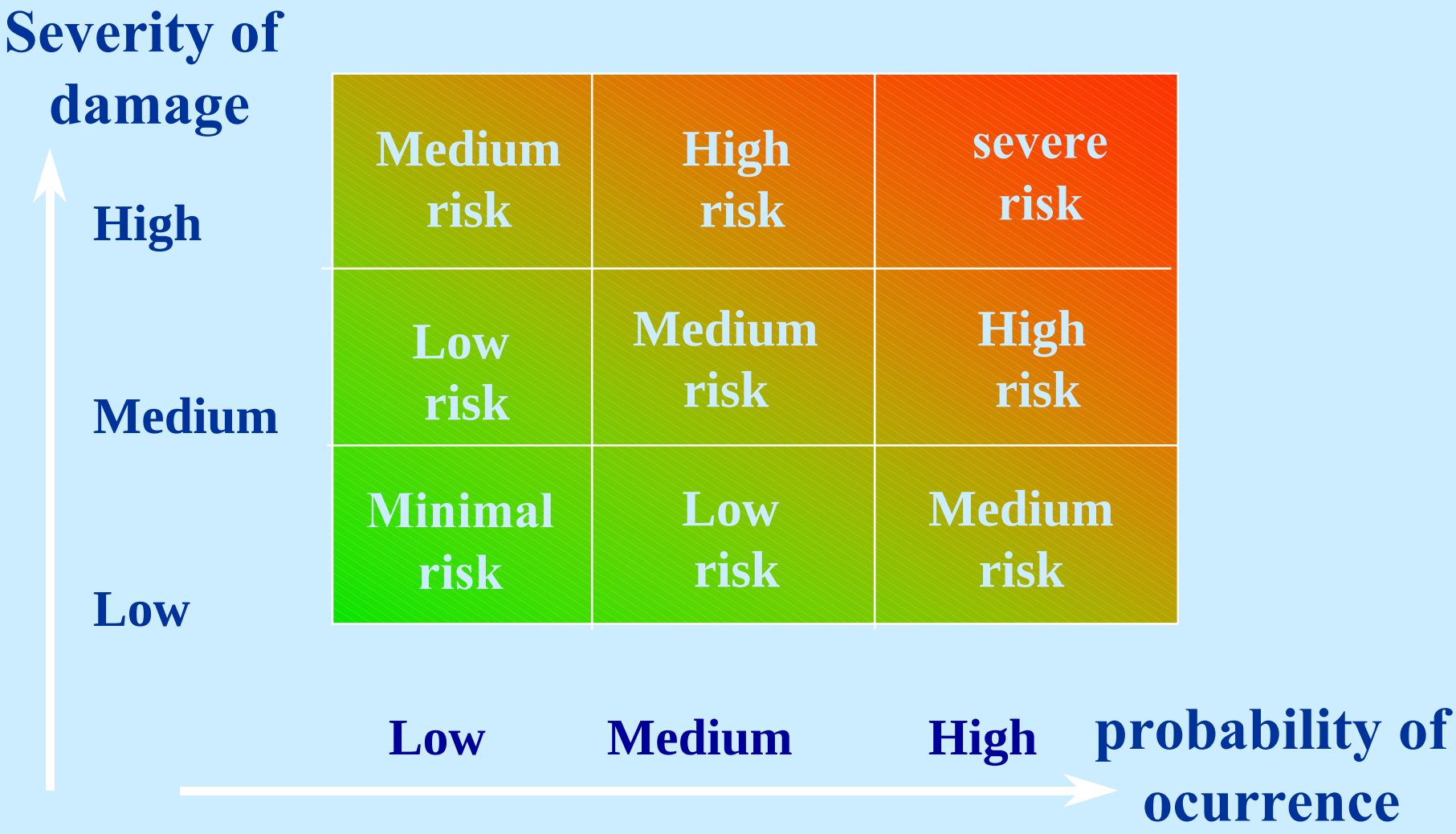


Credibility



Proactivity

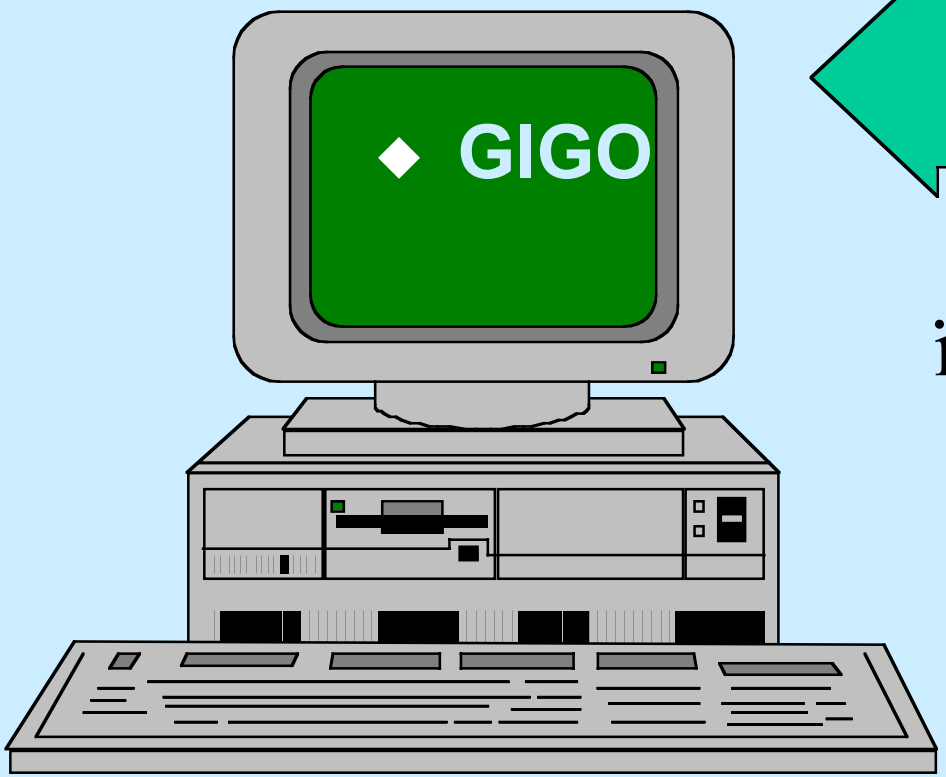
BASIS risk matrix



Simplification strategies

- ëTypicalí accident
- Scale of damage
- Accident proximity

The Pentium® illusion



This is not an incident processing system

ï Greater effort must now be given to the analysis of the reports.

Improvement areas

- clarify causality levels
- improve reporting sheet
- improve the analysis protocol
- organize a multilayer communication pattern

Causality levels

safety analysis ï **How could this happen?**

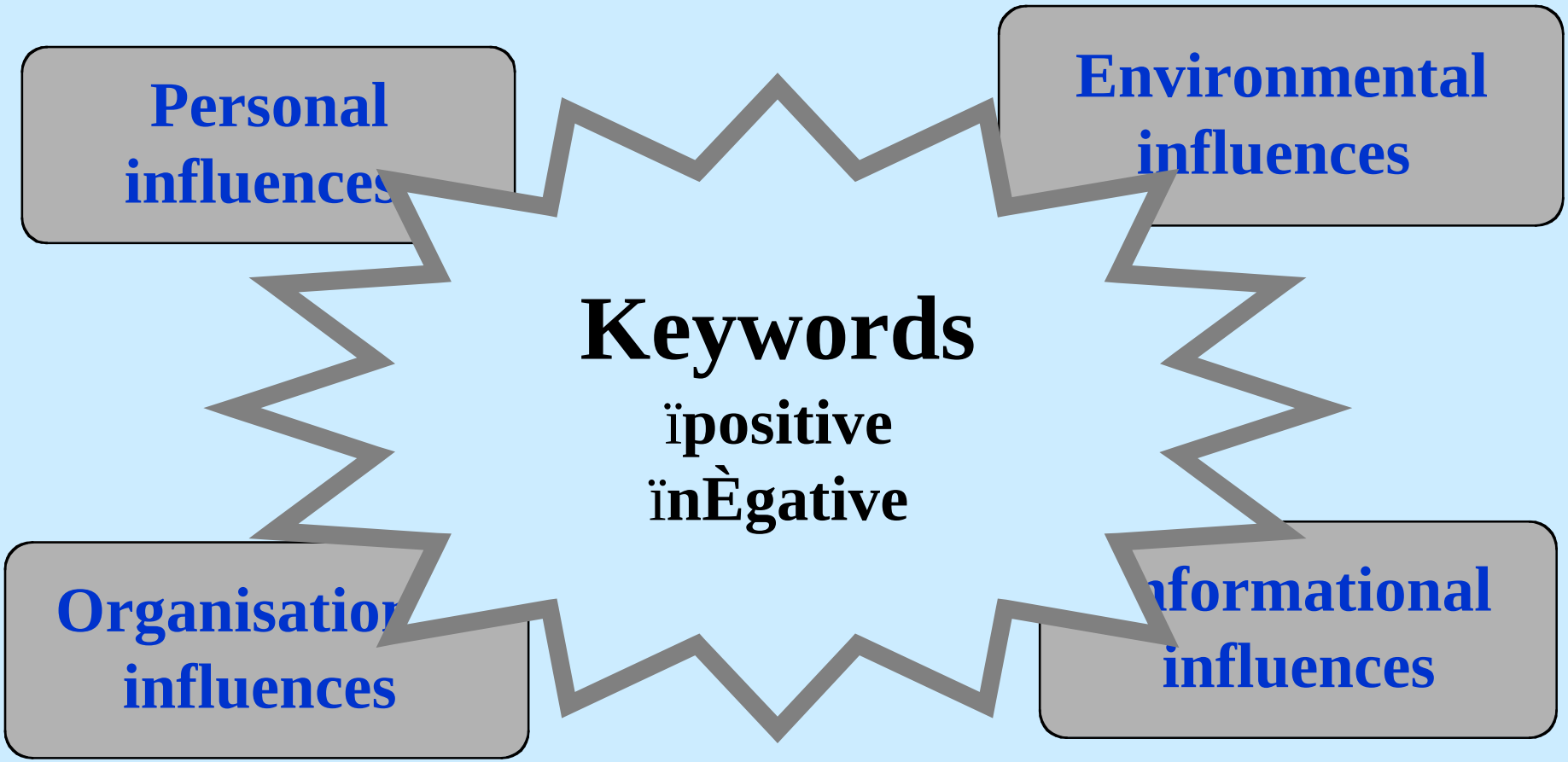
(systemic) causality **Why?**

incident scenario **What? Who? When?**

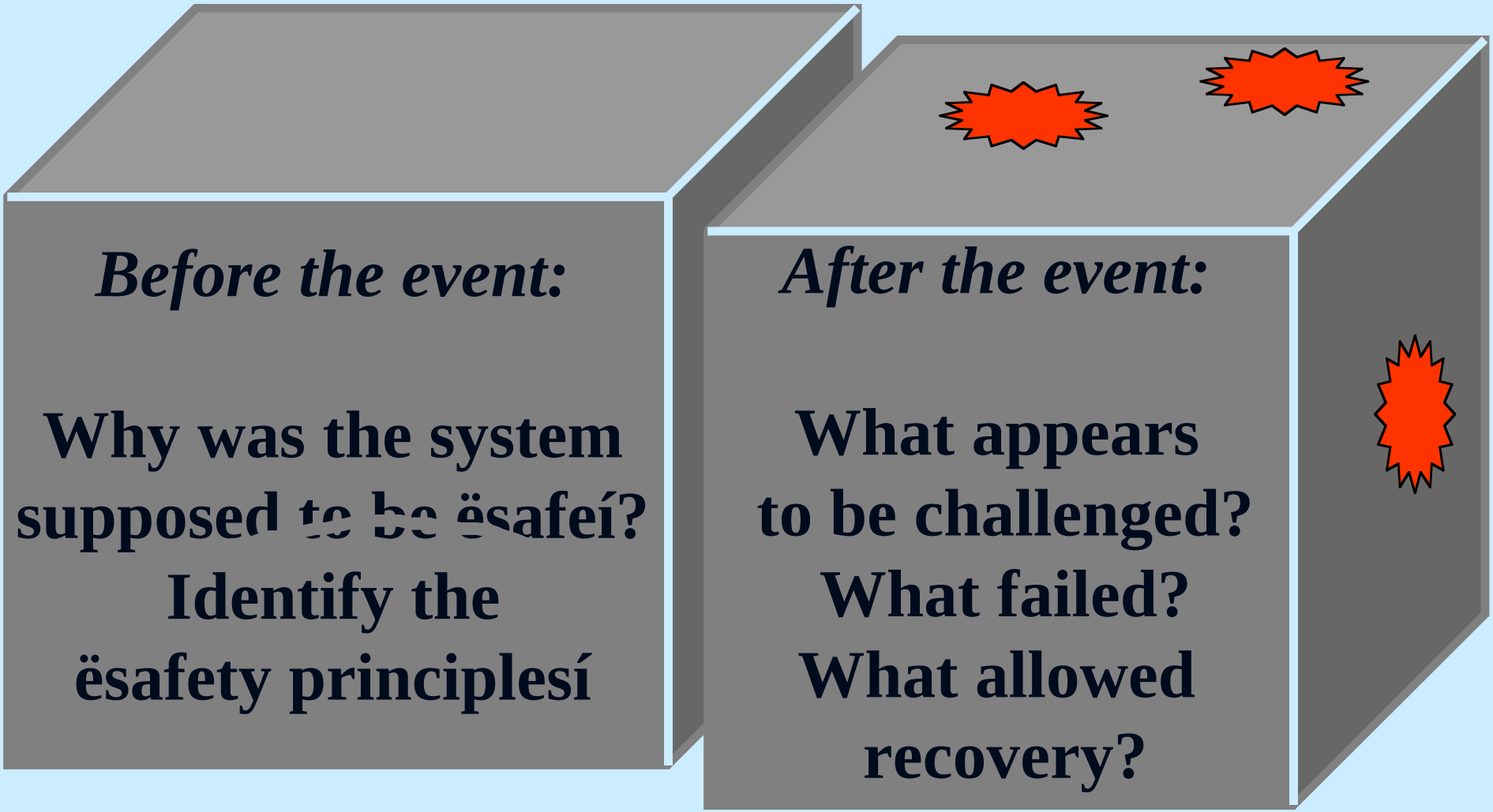
Reporting sheet format

- the event scenario: what happened?
- the ësystemís safety behaviourí: what helped/hindered (environment, company policies, procedures, crew or other personnel, A/C design, ...) ?
- your estimation of the risk
- who should read this and why?

AIRS causality model



Clarify safety reasonning



What failed ?

The substitution test : *what if we change ...*

- ñ the crew
- ñ the aircraft
- ñ the airport
- ñ ATC
- ñ the procedure
- ñ the context... ?

Safety principles

- Philosophies
- Policies
- Regulations, rules
- Procedures
- Rules of thumb
- Assumptions about:
  - organizations
  - teams
  - individuals

Normative safety

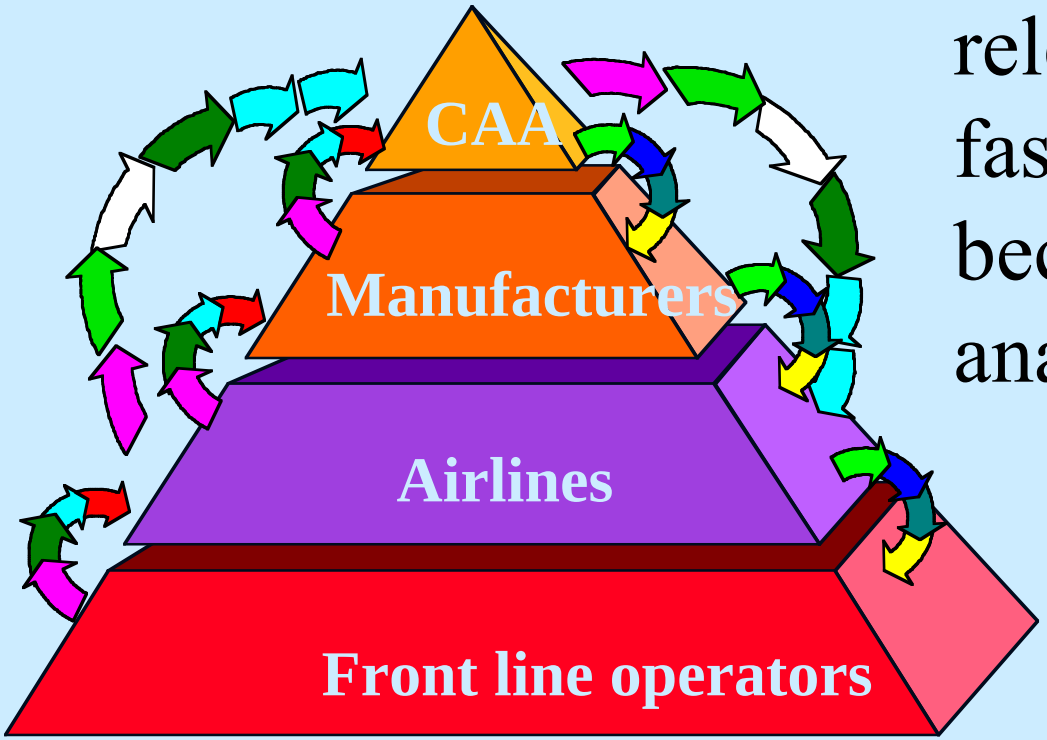
Safety through specifications

- ï safe processes can be specified (rules, procedures)
- ï (good) profesionals adhere to specifications
- ï Unsafe situations result from deviations:
  - ñ voluntary: violations
  - ñ involuntary: errors

Beyond normative safety

- Defences control pathogens
- Pathogens shape defences

Information pattern: a multi-layer protocol



To ensure that ordered information is sent to relevant others in a timely fashion (analysts' reports become inputs for other analysts).

Conclusions

- Develop number and quality of reports (confidentiality, reporting sheet, feed back)
- Develop prioritization strategies (typical accident, scale of damage)
- Calibrate analystsí interpretation (keywords)
- Clarify safety reasoning (safety principles)
- Organize a multi-layer communication protocol